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PERSONAL BELIEFS, THE ENVIRONMENT AND COLLEGE STUDENTS' EXERCISE AND EATING BEHAVIORS

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Abstract: College students are at risk for overweight/obesity. It was hypothesized that better nutrition and physical activity (PA) would be related to healthy environmental perceptions and personal beliefs. A survey was administered to 169 students. Linear regressions were performed to examine the relationships between PA/healthy dietary habits and perceptions of body weight, self-efficacy, perceived threat of health problems, awareness of and satisfaction with campus services (PA), and availability of healthy foods (nutrition), for overweight and healthy-weight students separately. Among healthy-weight students, greater self-efficacy was associated with more PA and healthier diets. Among overweight students, greater satisfaction with PA services was associated with more PA.

INTRODUCTION

Sixty-five percent of American adults are overweight. The greatest increases in overweight and obesity occur in persons between 18-29 years of age (Racette, Deusinger, Strube, Highstein & Deusinger, 2005). This age range encompasses the age range of the typical college student. Approximately 36% of U.S. college students are estimated to currently be overweight or obese (American College Health Association [ACHA], 2006).

Physical inactivity and poor diet cause obesity and are the leading causes of death in America, leading to at least 300,000 deaths annually (Von Ah, Ebert, Namvitroj, Park & Kang, 2004). Studies that have taken place in the college population suggest that unhealthy diets and low physical activity (PA) levels are the largest contributors to the overweight/obesity problem among this group (Huang et al., 2003). Fifty-seven percent of males and 61% of college females report no vigorous or moderate activity on three or more days of the week (Buckworth & Nigg, 2004). College presents an opportune time to establish healthy behaviors, yet research indicates that decline in physical activity occurs in the early adulthood period, between 18 and 24 years of age (Von Ah, Ebert, Ngamvitroj, Park & Kang, 2004; Racette et al., 2005).

Eating habits are also a problem in both the general population as well as among college students. Only 28% of persons over the age of two are meeting daily recommendations for fruit intake and even

fewer (3%) are meeting daily recommendations for vegetable intake (Office of Disease Prevention & Health Promotion, 2000). College students often exceed the recommended daily limit for saturated fat intake. A study by Racette (2005) found that more than half the students in their sample reported eating high-fat fried or fast foods at least three times per week.

Intra-personal, inter-personal and environmental factors have been found to affect college students' PA and eating habits. A 2004 study found that self-efficacy was a significant predictor of PA and nutrition behaviors. The higher the self efficacy and the lower the perceived barriers to PA and nutrition, the more likely respondents were to engage in protective behaviors, e.g., exercising three times per week and/or eating well (Von Ah et al., 2004). Inter-personal factors such as social support have also been found to play a positive role in students' PA and eating behaviors and the lack of social support has been shown to be detrimental to health behavior during times of stress (Von Ah et al., 2004).

Environmental influences that impact college students' PA and eating habits have also been identified. Buffet style cafeterias and excessive portions served at dining halls have been implicated in over-eating and poor nutrition (Levitsky, Halbmaier, & Mrdjenovic, 2004). And while research on environmental influences on PA in this population is scarce, the working and living environments of students have been shown to influence students' PA habits

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negatively (Keating et al., 2005). In a study by Reed & Phillips (2005), the intensity and duration of PA increased as one's proximity to exercise facilities increased. Additionally, studying increases the time students spend in sedentary work. Students report spending almost 30 hours during a typical week in sedentary behaviors, most often because they are studying (Buckworth & Nigg, 2004). When students do have leisure time, many of them choose to use it for activities other than PA and participate less in organized sports (Levitsky, Halbmaier, & Mrdjenovic, 2004). Also, many students spend a great deal of time watching television and using computers. Greater hours of television viewing have been associated with being overweight, and the average college student reports watching two hours of television per day (Nelson, Gortmaker, Subramanian, Cheung, & Wechsler, 2007). The hours of sedentary behavior coupled with heavy advertising for unhealthy foods, may explain why TV watching is associated with being overweight. Among college women and men, television watching and computer usage have been negatively correlated with PA, and thus are behaviors that compete with active behaviors for college students' leisure time (Buckworth & Nigg 2004).

Because college students are in a transitional period in which they are often making independent decisions about healthy eating and PA for the first time, it is important for researchers to understand the environmental and social factors that are important during college, and how these factors influence student behavior and environments (Nelson et al., 2007). *Healthy Campus 2010* lists PA and overweight and obesity in the top two leading health indicators for college students (ACHA, 2006). However, investigations of the factors that potentially contribute to unhealthy behaviors in this population have been limited and comparisons between overweight and healthy-weight students have not been made. The purpose of this study was to examine the roles of personal beliefs and environmental perceptions in determining students' levels of PA and dietary behaviors. Specifically, two hypotheses were tested:

Hypothesis 1: Students who report more positive personal beliefs and environmental perceptions will engage in more PA than students reporting less positive personal beliefs and environmental perceptions;

Hypothesis 2: Students who report more positive personal beliefs and environmental perceptions will report healthier nutritional habits than students reporting less positive personal beliefs and environmental perceptions.

Because the impact of personal beliefs and environmental perceptions may differ for healthy-weight and overweight students, this investigation tested these hypotheses separately for each group.

METHODS

Two hundred twenty-three students aged 18 or older and enrolled in one of three sections of a personal health class were eligible to participate in a paper-based survey administered during one week of the Fall semester. The purpose of the survey was to assess the needs of the campus community for nutrition and physical activity resources. The present investigation is a secondary analysis of the data collected. One hundred sixty-nine students completed the survey ($n=169$), yielding a 76% response rate. The study was approved by the Institutional Review Board at the State University of New York at Brockport.

MEASURES

Demographic data recorded by participating students included age, sex, major, and place of residence. Students were also asked to report their height (in) and weight (lbs) so BMI values could be calculated with the following formula: $\text{weight (lbs)} / \text{height (in)}^2 \times 703$ (CDC, 2006). Students were categorized as underweight (BMI below 18.5), normal (BMI 18.5-24.9), overweight (BMI 25-29.9), or obese (BMI above 30) (CDC, 2006).

In order to assess PA, students were asked three questions regarding the number of times in the past week they engaged in moderate, vigorous, and strengthening activities (CDC, 2007). Response options ranged from 1-3 (1 = no activity, 2= 1-2 days per week, 3= three or more days per week). These three questions were combined to form a summative scale representing overall PA ($\text{Alpha} = 0.73$).

Participants were asked nine questions regarding their dietary behaviors. The questions were adopted and modified from the Rate Your Plate nutritional assessment (Institute for Community Health Promotion at Brown University, 2005). Specifically, students were asked to report how often, on average, they eat fruits, vegetables, grains, meats, sweets, and fatty foods. Response options ranged from 1-3, (1=least frequent, 3=most frequent). Items which asked about foods that are less nutritious were reverse coded. Student responses were combined to form a summative scale representing dietary wellness ($\text{Alpha} = 0.66$).

Environmental perceptions were captured using four questions created for this investigation. First, students rated their satisfaction with the college's PA and recreational services on a scale from 1-4 (1=not at all satisfied, 4= very satisfied). For analysis, this variable was dichotomized into those who were "not satisfied" and "somewhat satisfied" verses those who indicated they were "satisfied" and "very satisfied." This dichotomization was based on the distribution. Second, students indicated the PA/recreational services (e.g. team sports, intramural sports, club sports,

group exercise, and open recreation) of which they were aware. This variable was also dichotomized based on the distribution into those who were aware of 0-4 services versus those who were aware of five or more services. Students were also asked to report the extent to which healthy foods were available at campus eateries on a scale from 1-3 (1=no healthy options available, 2=some, 3=many). This variable was also dichotomized based on the distribution into those who indicated there were no or some healthy foods on campus versus those who indicated there were many healthy foods on campus. Lastly, students were asked where they typically obtained "junk foods." Venue options included vending machines on/off campus, dining services on campus, and restaurants and grocery stores off campus. An "I do not eat junk food" option was listed as well. The number of venues from which students obtained "junk food" was used in the analysis. Students who obtained junk food from 0 or 1 place were compared to students who obtained it from 2 or more places. Finally, students were asked to estimate the current rate of overweight/obesity on their own college campus on a scale of 1-6.

Six questions created for this investigation were used to assess the personal beliefs of students. Students were asked if they viewed themselves as underweight (1), normal weight (2), or overweight (3). This variable was dichotomized into those felt they were underweight or were normal weight compared to those who felt they were overweight. Students also rated the likelihood that they would suffer from a weight related health problem on a scale from 1-4 (1=not at all likely, 4=very likely). Based on the distribution, this variable was dichotomized into those who felt it was "not at all likely" versus those who felt it was "somewhat" to "very likely." In addition, students' rated the severity of a weight-related health problem, should they acquire one, on a four-point scale (1=not at all serious, 4=very serious). Lastly, students' self-efficacy in creating and maintaining a PA program and in making healthy dietary choices was measured by asking two questions, "how confident are you that you can create your own PA program/choose healthy, nutritious foods for your diet?". Students responded on a four-point scale (1=not at all confident, 4=very confident). These last three items were dichotomized into those who indicated "not at all" and "somewhat" confident versus those who indicated "confident" and "very confident." These dichotomies were based on the variables' distributions.

ANALYSIS PLAN

For the purpose of analysis, weight classifications were collapsed into two categories and respondents were grouped as healthy-weight (BMI<25) or

overweight (BMI≥25). It was expected that overweight students would experience different influences on their behavior than healthy-weight students. Therefore, to test the hypotheses, linear regression models were constructed to explain PA and dietary wellness for the healthy-weight and overweight groups separately. Age, sex, and on/off campus living status were controlled. Analyses were conducted using SPSS 15.0 (SPSS Inc., 2006).

RESULTS

SAMPLE CHARACTERISTICS

As indicated in Table 1, the majority of participants were female and about half (58%) lived off campus. The average age of students participating in the study was 22. Thirty-three percent of students were physical education majors and 14% of participants were health science majors. Other majors included history, English, mathematics, and education. Forty percent of students in the sample were classified as overweight or obese. Students who were overweight tended to be older, were more likely to live off campus, and were more likely to be male than healthy-weight students. Healthy-weight and overweight students did not differ on their perceptions of the college environment. However, overweight students were more likely to report viewing themselves as overweight and believing that they will personally suffer from a weight related problem. Slightly over half of the overweight group reported that they viewed themselves as overweight. While healthy-weight students reported greater levels of physical activity and dietary wellness, healthy-weight and overweight students did not differ significantly on their reports of these behaviors.

LINEAR REGRESSION

Results of linear regressions for physical activity and dietary wellness are displayed in Tables 2 and 3 respectively. Healthy-weight students who reported that they were confident in their ability to create and maintain a PA program reported greater levels of PA than healthy-weight students who reported less confidence. Likewise, among healthy-weight students, those who reported greater confidence in creating a healthy diet reported greater levels of dietary wellness. Healthy-weight females also reported greater levels of dietary wellness than healthy-weight males. Among overweight students, those who reported higher levels of satisfaction with the PA services available on campus reported higher levels as PA.

DISCUSSION

Forty percent of the current sample was classified as overweight or obese. Yet, only 51% of those classified as overweight or obese reported that they

Table 1. Sample Characteristics

	Healthy-weight n=102 N(%)	Overweight n=67 N(%)
Demographics		
Age (Mean(SD))	21.25(4.12)	23.48(5.82)*
Female	70(68.60)*	33(49.30)
Off Campus	50(49.00)	48(71.60)*
Physical Activity (Mean(SD))	6.78(1.70)	6.66(1.87)
Dietary Wellness (Mean(SD))	17.30(3.16)	16.72(3.20)
Environmental Perceptions		
Satisfied with PA services	50(64.10)	28(63.60)
Healthy Food Available	31(30.40)	23(34.30)
Campus Obesity		
5-10%	9(8.80)	4(6.00)
11-12%	36(35.30)	30(44.80)
26-50%	44(43.10)	27(40.30)
51-75%	13(12.70)	6(9.00)
Aware 5 or more PA services	73(71.60)	41(61.20)
Obtain Junk Food from 2 or more venues	27(27.00)	11(17.70)
Personal Beliefs		
View self as overweight	12(11.90)	34(50.70)*
Weight problem is likely	45(44.10)	44(65.70)*
Weight problem is serious	60(58.80)	44(65.70)
Confident can plan PA program	72(70.60)	43(64.20)
Confident can choose healthy food	79(77.50)	45(67.20)

*p<0.05

Table 2. Linear regression of predictors of physical activity among healthy-weight and overweight students

	Healthy-weight n=102 Adj.B(p value)	Overweight n=67 Adj.B(p value)
Age	0.11(0.40)	0.02(0.87)
Female	-0.19(0.10)	-0.32(0.07)
On-Campus	0.14(0.23)	-0.00(0.98)
Weight Problem Likely	-0.21(0.08)	-0.01(0.95)
Weight Problem Serious	0.17(0.12)	0.15(0.30)
Confident can create PA program	0.27(0.02)*	0.15(0.31)
View self as overweight	0.08(0.51)	-0.30(0.12)
Aware of 5 or more services	-0.11(0.32)	0.05(0.73)
Highly satisfied with campus PA services	0.12(0.30)	0.37(0.01)*
Campus obesity	0.15(0.19)	-0.11(0.42)
Adj R Squared	0.30	0.49

*p<0.05

Table 3. Linear regression of predictors of dietary wellness among healthy-weight and overweight students

	Healthy-weight n=102 Adj.B(p value)	Overweight n=67 Adj.B(p value)
Age	0.19(0.10)	0.14(0.33)
Female	0.35(0.00)*	0.19(0.21)
On-Campus	-0.21(0.06)	0.19(0.19)
Weight Problem Likely	-0.01(0.61)	-0.08(0.63)
Weight Problem Serious	0.07(0.48)	0.06(0.67)
Confident can choose healthy food	0.27(0.01)*	0.25(0.10)
View self as overweight	0.10(0.36)	-0.05(0.76)
Campus obesity	-0.03(0.79)	-0.02(0.87)
Perceive availability of healthy food	-0.05(0.64)	-0.04(0.78)
Get "junk food" from 2 or more venues	-0.12(0.26)	-0.15(0.24)
Adj R Squared	0.19	0.20

*p<0.05

viewed themselves as overweight. This discrepancy is reason for concern as students may not be prepared to take action to improve their health if they have not recognized a need to do so. It must be noted, however, that BMI was calculated from self reported height and weight data and, thus, is subject to reporting error. In addition, highly trained athletes may have increased BMI scores due to increased muscularity rather than body fatness (CDC, 2006). Thus, it is possible that BMI scores are overestimated for some of the sample. Furthermore, categorizing college students as overweight or obese is difficult because the ages of this population fall within the transition from adolescence to adulthood (Huang et al., 2003). Even with these limitations, the fact that half of the overweight students did not view themselves as such is an issue that deserves further investigation in order to inform college based prevention services.

It was hypothesized that students who engage in PA more frequently will have more positive personal beliefs and more positive environmental perceptions than students who engage in PA less frequently. This hypothesis was partially supported as, among healthy-weight students, greater confidence in ability create a PA program was associated with greater PA and, among overweight students, greater satisfaction with campus PA services was associated with greater PA. The second hypothesis was that students who reported eating more healthfully would have more positive personal beliefs and more positive environmental perceptions than students who reported eating less healthfully. Again, this hypothesis was partially supported as, among healthy-weight students, greater confidence in choosing nutritious

foods was associated with more healthful eating. Among the healthy-weight group, findings regarding students' confidence are similar to a 2004 study (Von Ah et al., 2004), which found that higher levels of self-efficacy resulted in increased health promoting behavior for PA and nutrition. Self-efficacy is a predictor of motivation to engage in health promoting behaviors and motivation is a common barrier cited by students to engaging in regular PA (Schnoll & Zimmerman, 2001).

It appears that the influences on eating and PA may differ between overweight and healthy-weight students. Overweight students may be more affected by their perceptions of their environments and the supports available to them from that environment, while healthy-weight students may be more affected by their personal beliefs, namely their confidence in their ability to exercise and eat healthfully. However, for both groups the fact that this was a cross-sectional investigation precludes determining the temporality of the influences and the behaviors. Yet, the distinction between such potential influencing factors is an important one for campus prevention services. If these findings are reproduced in future studies, prevention services may choose to utilize different tactics to promote PA and healthy eating for healthy-weight and overweight students.

FUTURE RESEARCH

Future research should focus on collecting data from a larger, more representative sample. Data in the current investigation were collected utilizing a convenience sample and the sample was relatively small. Research should also aim to take biometric

measures to establish accurate estimates of BMI. Also, measures of dietary wellness and PA could also be improved by implementing the diary method to collect such data, as this has been proven to be more accurate than participant recall (de Castro, 2000). Longitudinal studies should be conducted to establish temporality when examining influential factors on college students' PA and dietary behaviors. Future research should also seek to further identify unique influences on PA and dietary behaviors for healthy-weight and overweight students, as this investigation has indicated that these groups may be fundamentally different in this regard.

Considering that two-thirds of the adult population in America is overweight or obese, it is im-

portant for college institutions to take action to address this public health problem and understand that the college setting can play a crucial role in the obesity epidemic by educating students and encouraging them to adopt life-long healthy behaviors. An understanding of the influential factors promoting or hindering PA and healthy eating among the college population is essential. This investigation has given some insight into how overweight and healthy-weight students may differ with regard to such influences. More research is needed to indicate differential programming tactics for such groups.

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